EPA Efforts for CO2 Geologic Storage

Regional CS Partnership Program
Pittsburgh, PA
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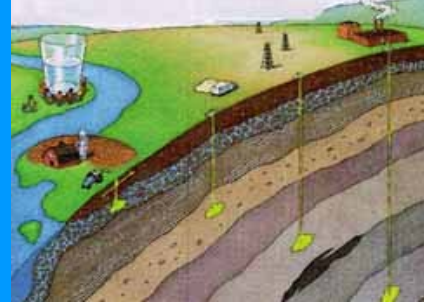
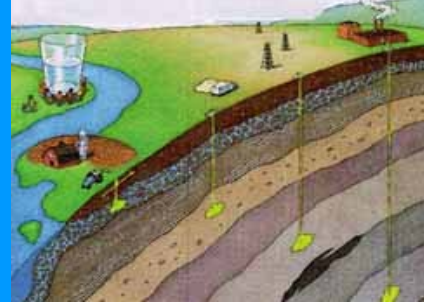
OGWDW and OAP

Overview



- EPA has been very active supporting CCS by participating at a large number of DOE-sponsored conferences and through its own initiatives, including a workgroup and workshops
- EPA acknowledges that the deployment of CCS technology will need support from a range of stakeholders
- EPA has the technical & regulatory expertise and experience working with key stakeholders
- Fully utilizing interagency resources can facilitate progress over the coming years

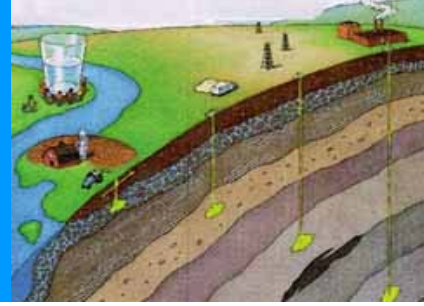
Collaborative Efforts



EPA is active in various forums working to address technical and regulatory issues through collaborative efforts

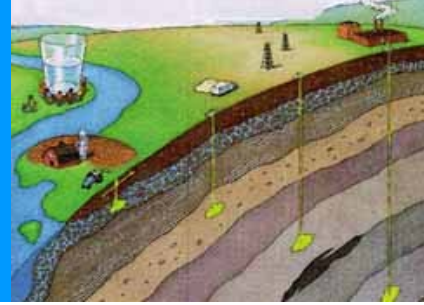
- International Efforts
  - Carbon Sequestration Leadership Forum (CSLF)
  - Intergovernmental Panel on Climate Change (IPCC)
- Federal Efforts
  - Working with DOE Labs (NETL, LBNL)
  - GHG Inventory and Accounting
  - Conferences and Workshops
- State Efforts
  - Interstate Oil and Gas Compact Commission
  - Ground Water Protection Council

EPA Efforts: Geologic Sequestration Workgroup



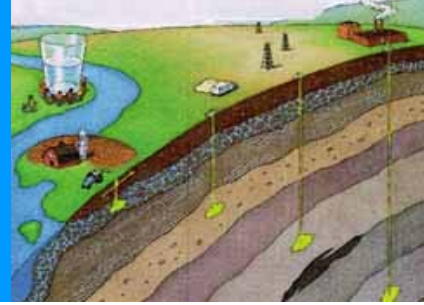
- Internal EPA Geologic Sequestration Workgroup includes 30 members from HQ Offices, EPA Regions, and EPA Labs
- Collaborative effort led by EPA's Offices of Air and Water (initiated in August 2004)
- Efforts focus on technical and regulatory issues, risk assessment, communication and outreach

Key Technical Issues for Workgroup

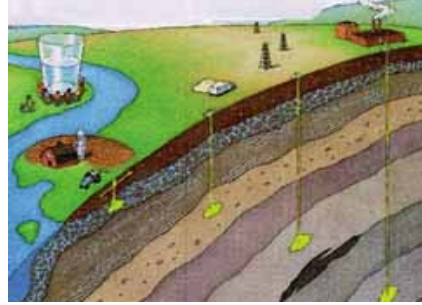


1. Injection Well Construction & Mechanical Integrity of Existing Wells
2. Site Selection Criteria
3. Ability to Demonstrate Reservoir Capacity
4. Monitoring Techniques and Approaches
5. Remediation Options
6. Site Closure and Plugging & Abandonment Practices

EPA Efforts: Water (UIC Program)

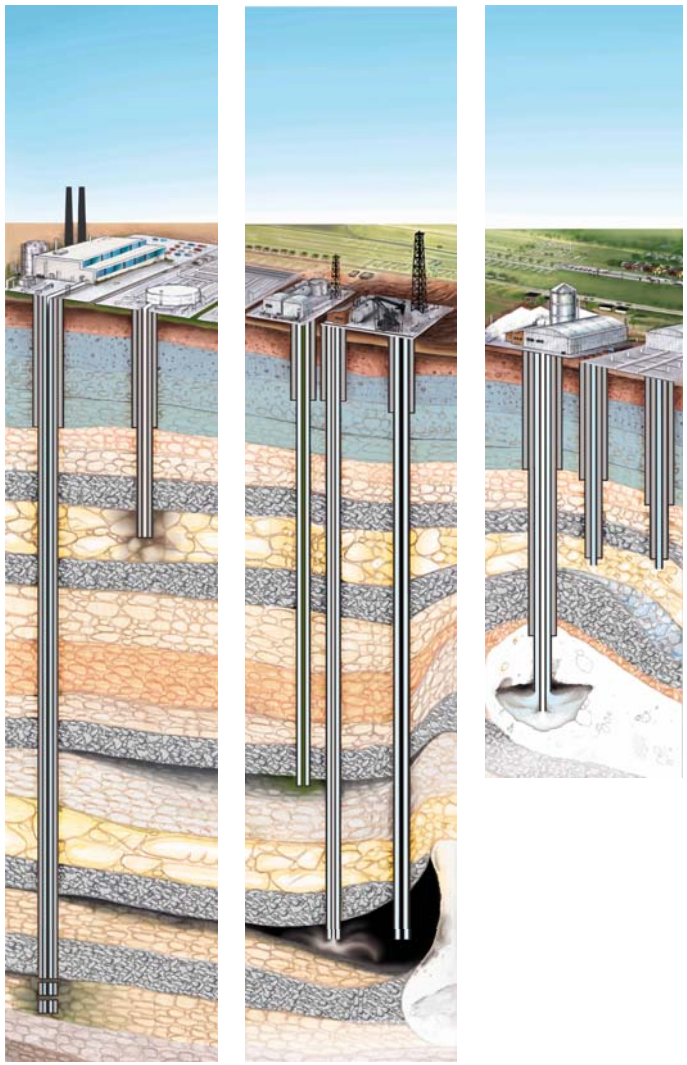


- **Safe Drinking Water Act (SDWA)**
  - Underground Injection Control (UIC) Program regulates injection of ALL fluids – liquid, gas, or slurry
  - Program covers injection of wastes and commodities (e.g. liquid hydrocarbons, drinking water)
  - Only exemptions for natural gas storage and hydraulic fracturing
  - Could provide existing framework for CCS implementation
- **Current Efforts**
  - EPA is evaluating technical issues (assisted by UIC TWG) and applicability of SDWA and UIC regulations (with OGC)
  - Class V experimental well category has been used for temporary R&D projects (non-EOR) such as Frio Brine - permits issued by states
  - In general, CO2 EOR wells are covered under Class II



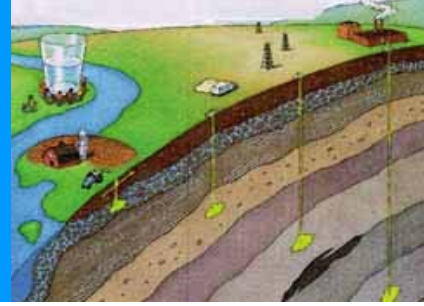
UIC WELL CLASSES

Class I **Class II** **Class III**



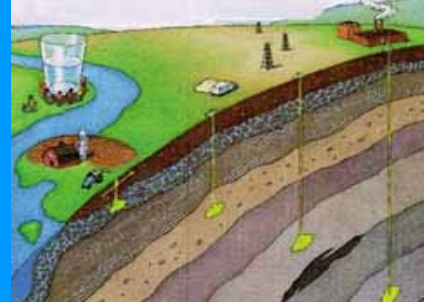
Class V

EPA Efforts: Water (Ocean Programs)



- **London Convention (LC)**
  - Covers deliberate disposal of wastes at sea
    - Prohibits disposal of certain hazardous materials
    - Requires a permit for disposal other wastes or matter
  - Oil and Gas (including Sleipner and EOR) operations are **exempt**
  - LC Implemented through Marine Protection, Research, and Sanctuaries Act (overseen by EPA/OWOW)
- **Current Efforts**
  - LC is evaluating technical and legal aspects of sub-sea bed disposal of CO_2
  - Scientific Group concluded that CCS is an important technology and risks can be low if projects are properly sited and managed
  - Legal issues will be discussed at the Consultative Meeting Oct. '05
  - A technical working group will meet in April 2006 to review the IPCC Special Report and discuss risk assessment

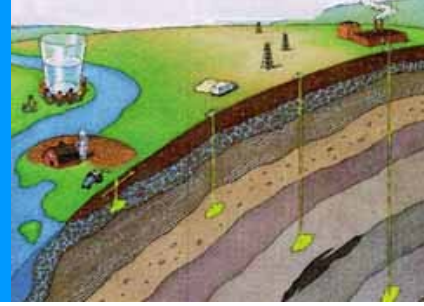
EPA Efforts: OFA Federal Programs



- National Environmental Policy Act (NEPA)
  - Requires federal agencies to consider the environmental impacts of their proposed actions and *reasonable* alternatives to those actions
  - Usually, a detailed Environmental Impact Statement (EIS) is prepared to meet this requirement
  - EPA reviews, comments on, and maintains a national filing system for EISs: www.epa.gov/compliance/basics/nepa.html

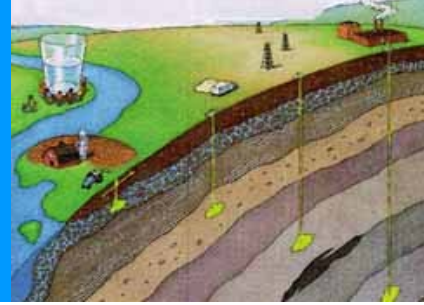
- Current Efforts
  - The Programmatic EIS will be made available for public comment and DOE will host public meetings: www.netl.doe.gov/coal/Carbon%20Sequestration/eis/
  - EPA will review and provide comments and has been encouraging stakeholders to participate in this process

EPA Efforts: Technical Workshops



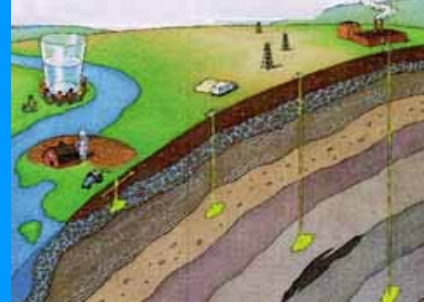
- Geologic Modeling and Reservoir Simulation
  - April 6-7, 2005 in Houston, TX
  - Assess modeling capabilities for site characterization, risk assessment, and simulating long-term storage
- IPCC Inventory Guidelines & US GHG Inventory Methods
  - March 9, 2005 in Washington, DC (IPCC Guidelines)
  - September 27, 2005 in Portland, OR (EOR/US Inventory)
  - Encourage active participation and expert input in development of IPCC Guidelines and improving US Inventory
- Risk Assessment & Management
  - September 28-29, 2005 in Portland, OR
  - Share information and solicit expert input from a wide range of stakeholders including researchers, industry, NGOs, and regulators.

Initial EPA Workshop Findings



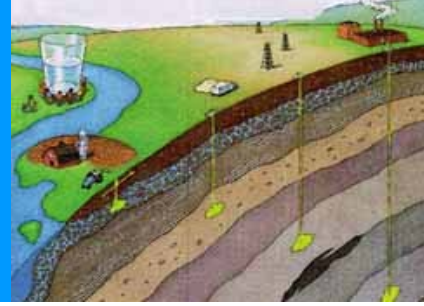
- Very strong participation in our workshops, and good suggestions for future research efforts
- More work may be needed on site characterization for permitting, and additional risk assessment
- EPA, in conjunction and with support from LBNL, is planning another workshop focusing on these issues in March 2006 in the Bay Area
- GWPC plans to dedicate their January 2006 Austin, Texas meeting to CO2 issues including regulatory discussions

Importance of Stakeholders



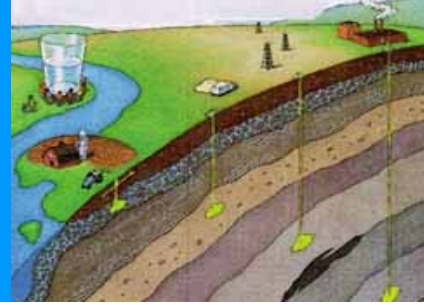
- It is important to assure the public that CCS, potentially a key climate mitigation technology, can be safe and effective
- U.S. is uniquely positioned to support global efforts to facilitate this technology:
  - DOE R&D and Regional Sequestration Programs continue to provide data and demonstration projects
  - EPA's UIC program provides an existing framework and demonstrates safe underground injection of a variety of fluids
- EPA welcomes input from a diverse set of stakeholders who can provide valuable insight on technical issues, economic impacts, and public concerns
  - www.epa.gov/publicinvolvement
- Applaud DOE for leadership and encourage stakeholders meetings throughout the year

Collaboration with Regional Partnerships



- EPA and State UIC programs had extremely limited participation in Phase I
- Strong relationships with State and Federal Agencies will facilitate implementation and public acceptance of CCS
- EPA encourages development of an early and ongoing dialogue with relevant permitting agencies

Final Thoughts



- EPA shares your enthusiasm for CCS technologies which could ameliorate climate changes
- Groups such as the GWPC and IOGCC can provide positive contributions to efforts
- Participation by stakeholders and public outreach will be critical to the success of CCS
- EPA will continue to be an active participant and supporter of DOE's research efforts